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## **Analyzing the Space–Time of Collaborative Sensemaking Through Video Analysis: Methodological Reflections on a Case Study**

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## Abstract

In this research methods case study, I discuss some of the methodological choices I made and some of the challenges that I encountered while investigating how people organize the context of their activities in space and time. In this case study, I collected and analyzed video data to look at the organization of space and time during learning activities mediated by information and communication technologies (ICT). According to the qualitative approach I adopted, research designs have “built-in flexibility” allowing new and unexpected insights, leading to a growing sophistication of the design itself. This type of qualitative research is characterized by the progressive, non-linear development of theory and by the continuous interaction of theory and data throughout the process. Even though such non-linearity often constitutes an added value for qualitative research, it does not eliminate the need for a rigorous preliminary planning. I will use the example of the data collection and analysis of my case study to reflect on the delicate equilibrium between initial planning and flexibility of the research design in qualitative video analysis.

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## Learning Outcomes

By the end of this case, students should be able to

- Create a research design that combines rigorous initial planning and built-in flexibility
- Understand the methodological implications connected to information concerning the features of the research context
- Understand the importance of consulting relevant literature when making preliminary interpretations of the data

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## Introduction

In this research methods case study, I discuss some of the methodological choices I made and some of the challenges that I encountered while investigating how people organize the context of their activities in space and time. In particular, in the case study presented here, I collected and analyzed video data to look at the organization of space and time during learning activities mediated by information and communication technologies (ICT).<sup>1</sup> My interest in this topic was inspired by approaches such as the distributed cognition (Hollan, Hutchins, & Kirsh, 2000), the extended mind (Clark & Chalmers, 1998), the ecology of mind (Bateson, 1987), dialogical theory (Linell, 2009), and cultural-historical psychology (Cole, 1995). These approaches have richly discussed how psychological processes extend beyond our individual brains, involving social practices, mediation by technology, and larger cultural-historical and institutional

phenomena.

As the analytic interest shifted from individual thinking and learning to collaborative processes mediated by ICT, researchers have developed novel methodological solutions. Currently, one widely used method to examine collaborative processes mediated by technology is video analysis, which allows for detailed accounts of social processes (Goldman, Pea, Barron, & Derry, 2014). In particular, in the case study presented here, I adopted a qualitative approach to video analysis. According to this approach, research designs have “built-in flexibility” allowing new and unexpected insights, leading to a growing sophistication of the design itself (Denzin & Lincoln, 2005, p. 376). This means that although I had planned in advance the procedures for data collection and analysis, I have tried to adapt my research strategies to the local needs of the research site and to the interpretative hypotheses and ideas that I developed throughout the research process. Thus, I did not experience a linear research process, where a pre-existent hypothesis was tested through a careful implementation of a predetermined research design.

The qualitative research I adopted was characterized by the progressive, non-linear development of theory and by the continuous interaction of theory and data throughout the process (Engle, Conant, & Greeno, 2007; Hammersley & Atkinson, 2007). In other words, my interpretations emerged from an iterative process involving two opposite (though complementary) actions: (1) searching for (theoretical) concepts that could improve my sense of the data that I was collecting and analyzing and (2) searching for data that could enrich my current understanding of the phenomenon I wanted to investigate. Even though such non-linearity often constitutes an added value for qualitative research (Denzin & Lincoln, 2005, p. 376), it does not eliminate the need for a rigorous preliminary planning. I will use the example of the data collection and analysis of my case study to reflect on the delicate equilibrium between initial planning and flexibility of the research design in qualitative video analysis.

Before proceeding with the methodological discussion, in the next two sections of this research methods case study I will spend a few words for describing the main theoretical concept that I used and the research context. Then, I will provide an account of how I planned my research design and how I modified it throughout the whole research process.

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### **The Main Theoretical Concept of My Research: Chronotope**

To examine the space and time of collaborative practices I used the concept of chronotope, which was first devised by Bakhtin (1981) to develop a dialogic conceptualization of space–time. In sum, chronotope serves to examine the meaning making associated to the organization

of space and time and the spatial and temporal arrangements typical of human social practices. For example, in my studies, I have analyzed how students and teachers frame space and time in discourse (Ritella, Ligorio, & Hakkarainen, 2017a), and how they bodily enact space–time configurations (Ligorio & Ritella, 2010). Given the scope of this research methods case study, I will not extensively discuss my theoretical framework, which has been described elsewhere (Ritella & Ligorio, 2016; Ritella, Ligorio, & Hakkarainen, 2017b). In this section, I will briefly discuss only four features of chronotope that bear methodological implications relevant for my arguments here.

First, chronotope implies an analytic focus on the meaning making processes through which people make sense of the space–time of the activities they carry out. Therefore, there is a need to adopt methods able to grasp the discursive and semiotic processes through which participants to collaborative activities negotiate the organization of space and time.

Second, it implies that both material and semiotic elements are equally relevant for interpretation (Leander, 2001). Thus, there is a need to use methods that are able to trace bodily actions and movements of materials during and across activities, but also to detect the ways in which these are intertwined with discourses and signs.

Third, space and time are considered as interdependent social constructions, so the methods devised for examining them should allow to implement a coordinated analysis and to grasp their potential interdependence in the local sites of investigation.

Fourth, space and time are relevant for different units of analysis, from the historical development of institutions in a society to the space–time coordination of actions during a single task. This requires that each study on space–time should clarify the unit of analysis and adapt the methodology to the chosen unit of analysis. In my analysis, I focus on the space–time relations emerging during the collaborative solution of a collaborative task by small groups. Therefore, the methods are adapted to this unit of analysis.

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### **The Research Context**

The case study presented here involves an interdisciplinary media design course held at Metropolia University, in Helsinki. The students worked in teams of four to five participants to develop a media design project. At the start of the course, representatives of companies presented project topics. The groups had to choose one of these topics and try to develop a product or service based on that topic. As intermediate tasks, they had to develop certain artifacts (business plan, sales pitch, etc.) that would be assessed by teachers. The course lasted 16 weeks and the students worked together for 2 days per week for a total of 10 hr per

week. They could use a technologically rich environment involving smart-boards, tablets, and notebooks. Groups were free to negotiate and select the tools they considered appropriate at the different stages of the course, which would give them a relatively high degree of autonomy in managing the collaboration. With the approval and the support of teachers, I presented the research to the students, and asked two groups to volunteer as participants in the study. Nine students volunteered, allowing the researcher to video their teamwork and participation in stimulated-recall interviews. The students filled in a survey about background information and signed an informed consent form about the research aims and the storage and use of the data. The participants were also informed that they could withdraw their consent at any moment, and that the researcher was at their disposal should they have any doubt or question. These are all very important aspects concerning research ethics, which also help to build a clear professional relationship with the informants of the research.

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### **Preliminary Methodological Choices**

At the outset of the research project, I had some meetings with one of the teachers that was organizing the course, who kindly accepted to help me, significantly facilitating my data collection. During these meetings, I explained my research interest, and we negotiated an initial plan for the research design. We agreed that I would follow one or two groups of students, provided that they would voluntarily choose to participate in my study. Thus, the first step that we planned was a presentation of my study to the students during the first lecture of the course.

Moreover, during these meetings, I collected a lot of useful background information concerning the course. One piece of information, which in hindsight revealed to be more important than I initially thought, was that the university provided a rich set of possible environments for collaboration and that the groups of students could freely book one of these rooms depending on their current needs. Some of the spaces required advance booking. The students were provided a big room (which could host simultaneously up to four groups), where one group per time could use a smartboard and connected tablets; a smaller room that could host only one group, equipped with a round table, chairs, and a desktop computer; a computer laboratory equipped with 24 workstations; and other regular rooms that could host simultaneously two or three groups, equipped only with desks and chairs. Given that my interest was on the organization of space and time I thought that this would be the perfect situation to examine how the students negotiated the space where to work, and how they moved across the different available spaces. As I will discuss in section “Data Analysis and the Importance of the Initial Research Design” of this research methods case study, I did not make full use of this background information for planning my data collection, and this fact constituted a limitation of

my research.

In collaboration with the teacher of the course and my supervisors, I gradually started to build my plan for data collection, based both on the information concerning the course that I had been gathering and on the main features of chronotope. Given that I was interested in bodily movements and spatial arrangements of material objects, as well as in discursive negotiation of space–time, I planned to collect video data through a camera focusing on each group of students. To ensure high-quality audio data, I planned to use also a stand-alone microphone for each group, in addition to the ones of the cameras. This required knowing in advance where the students would work, to set up the cameras before the beginning of each session. Indeed, given my interest in the organization of the space, it was important to record the initial phase of the sessions of collaboration, when most of the organization of the working-space was expected to happen. Thus, I planned to ask the volunteers to update me in advance about their decisions concerning the rooms they would use. In addition, given that my focus was on the organization of the team collaboration, we agreed that I would not collect data during the lectures of the course, but only during the sessions of group work. However, to better understand the students' discourse, I decided to attend some of the lectures that took place while I was on site for data collection. Finally, since I was interested also in temporal patterns of organization, I needed a research design allowing to follow the different phases of the collaboration. Thus, we agreed that I would audio-video record the students' teamwork during 2 weeks at the beginning of the course, 2 weeks in the middle of the course, and 2 weeks at the end, for a total of 12 days of audio-video recording. I planned to collect also secondary data, such as field notes written during the observation of the teamwork; collection of documentation concerning the observed activities; and notes from informal exchanges with the participants, when the cameras were turned off. I also agreed with the teacher that I would conduct two video stimulated recall interviews, that is, "video review sessions" (Jordan & Henderson, 1995) in which the participants watch selected episodes (e.g., some critical turning points of the activity) together with the researchers to "elicit participant's perspective on what was happening" (p. 85, Sawyer & DeZutter, 2009).

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#### **Data Collection and "Built-in Flexibility" of Qualitative Research**

After my presentation at the beginning of the course, 9 students (2 groups) volunteered and allowed me to follow their collaboration. They all signed the informed consent and filled up a brief survey for background information. Before each day of observation, I asked the participants about the schedule for that day and if they had already booked one or more spaces. Generally, as an observer I did not intervene in the interaction, but just observed, when

possible standing/sitting near the camera and changing the focus of the camera when the participants moved. At times, the students asked me questions concerning my research, or I asked them if they could give me a copy of the artifacts they produced.

Furthermore, any impressions about the ongoing collaboration were documented using field notes, which are source of rich information about the context of interactions. Because of the importance of what was taking place in the virtual space, I collected screen records of smart-board-mediated activity to complement the data. Right after each session of data collection, I reviewed the audio and video data and synchronized the video-audio record of the interaction with the screen records for a coordinated analysis. I used the software package Transana to transcribe and comment on video clips that seemed relevant and could be used for the video stimulated recall interviews. Finally, I had access to the intranet, whereby both the teachers and the students could insert and update artifacts related to the course, including the diary where students could describe their activities related to the course. The students of one group also granted me access to a Dropbox folder containing relevant artifacts for internal communication and the other group invited me to join a private Facebook group. These secondary data were used to clarify the interpretation of ambiguous speech or actions from the video.

The phase of data collection has been an intensive phase of this study. I carried out at the same time literature review, observation of the students' collaboration, reflection on the observed processes and writing of fieldnotes, synchronization, and exploration of the collected data leading to preliminary interpretation. Flexibility was the key term in this phase.

First, I adapted to the characteristics of the research site and to the characteristics of the group. Just to make an example, while usually the students were collaborative and told me in advance where they would work, at times they took decision during the break right before the start of the session. This meant that I had to find out strategies to quickly set up the cameras and record the students' set up of the space. When possible, a colleague was helping me in this job to accelerate the process. I would start immediately the video-recording while he would set up the tripod and additional microphone. As I mentioned above, since I was interested in how the students arranged space, it was important to observe how they arranged the workspace at the beginning of the session. Unfortunately, in some cases, this has been impossible. Another example is that one day the students went to carry out a marketing task directly on site (a hospital), where I was not allowed to take any record due to privacy issue. Thus, I had to reschedule the data collection of that day.

Second, I adapted to my insights and my preliminary interpretations of the data. Indeed, I changed the analytical focus of my study as I developed a much clearer sense of the



processes I wanted to investigate. Before the data collection, I implicitly assumed that the students would interpret the task based exclusively on teachers' words, and that they would organize their collaboration accordingly. Thus, my interest was on how the group organized space–time according to a given task, which I already knew thanks to my meetings with the teacher of the course. However, during the observation of the students' collaboration and the iterative review of the collected data (which I carried out step by step during the observation) I started developing the idea that the interpretation of the task is a much more complex form of sense making. For the students getting a clear sense of what they should do was a developmental process, where also the framing of space–time was involved. Thus, I started searching for literature on task interpretation and I found some studies discussing the complexity of task interpretation and the role that institutional contexts play in the process of making sense of the task (Lantz-Anderson, Linderoth, & Säljö, 2009; Newman, Griffin, & Cole, 1989; Säljö & Windhamm, 1993). These studies showed that presenting the exact same task in different contexts might lead to different interpretations by the students, some of which might be considered deviations from the task (Rajala & Sannino, 2015). Consulting this literature and discussing with some colleagues helped me to make sense of the data in a way that was totally unexpected when I initially planned my research design. Toward the end of the course, this insight seemed to be more and more fitting the data. In particular, during Week 14, I had an opportunity to follow a discursive interaction convincing me that it was worth to systematically analyze the relationship between task interpretation and space–time framing in the data.

On the Thursday of that week, after the lecture that took place in the early morning, I met the students at the computer room, where they worked mostly individually, sometimes coordinating their efforts and asking reciprocal advice. Then, after about 1 hr, we all had to leave the room because it had been booked for a lecture of another course. The students decided to have a coffee break, and invited me to follow them to the Unicafè for a break. They invited me to their table, and we started chatting for a few minutes. Once in the café, they said that this was for them a break and they were happy to have me there but one of the students asked to not video-record that moment. I felt that my position in relation to the group was changing, and I was undecided about my positioning in that interaction. Afterwards, I also asked myself if I should use the contents of this conversation for my analysis because of ethical reasons, since one of the students had asked to not record it. My understanding was that they did not want me to record their conversations taking place during the break, which could involve information about their private lives. However, after about 5 min of small talk, they switched topic and started talking about their interpretation of the task, which reframed the interaction. They did not involve me anymore in the conversation, thus I felt I was positioned again as an observer. In addition, the type of discourse was very similar to other interactions that I had recorded, where

the students proposed some changes to the design of their website and evaluated them. Thus, I wrote the content of the discussion in my field notes. Anyway, I was not sure that my interpretation was correct and that my behavior was ethically sound in this situation. What if the students did not want the teachers (or other people in general) to know what they intended to say about the task during this interaction? Thus, I introduced this topic directly with the participants before and during the subsequent stimulated recall interview taking place a few days later, and they did not object to the possibility of addressing this topic. On the opposite, they were willing to share their view on the topic and they added further details on the topic during the interview. Thus, I concluded that using this insight was not being inappropriate from an ethical perspective. I did not delete that content from the field notes taken during that day and went forward with my research.

The conversation at the Unicafé was interesting because the students talked about their interpretation of the task specifically in relation to time constraints. They discussed some new ideas that would improve their product, but if they decided to change their plans according to these ideas, it would imply revising other artifacts, like the business plan, which require time and efforts for being revised. One student reported that one teacher told her that they were not expected to work more than the 160 hr of the course, but that they could decide to work some extra hours if they agreed about this in the group. In this discourse, they seemed to fluctuate between an interpretation of the task as building a complete product for the real customer and one as a learning task where their goal was to demonstrate to the teachers that they had learned how to develop a project. They decided that they would not finalize the product because time limits seemed too pressing; they thought that for the teachers the current stage of the product was good enough, even if it was not ready for a real customer. It appeared that they all felt that working many extra hours was needed to create a product “ready for the market,” but for some of them, it was impossible because they had other commitments during the week (e.g., all of them were attending also other courses, some of them were working or doing an internship, and it was difficult to reserve extra time for the course). Thus, perceived time constraints seemed to contribute to the definition of the scope of the task for the students. It took a lot of discussion to define what they should do trying to find a balance between their changing interpretation of teachers’ requests, their will to present an excellent product to the customer (which was mentioned more than once) and the space–time constraints and opportunities of the context. I started wondering: if the students had more time and more resources, would they re-interpret the task as creating an object for the market? More in general, I asked myself if this was a special situation or if the students were more systematically considering—even implicitly—the space–time constraints of the learning situation as they made sense of the task throughout the whole course. As I will explain in

section “Data Analysis and the Importance of the Initial Research Design,” I decided to engage in a systematic search of the data to figure out if this was the case.

The week after this event, I had planned a video stimulated interview with the students. Initially the plan was to focus the entire interview on the organization of the collaboration in terms of how they arranged the workspace, defined the schedule of the collaboration, divided the workload within the group, and so on. However, I was by then convinced that I should gather more information on how the students interpreted the task, on what they thought about the teachers’ expectations, on how they decided what they would actually do to accomplish the task. Thus, I reserved part of the interview to discuss with the students these kinds of issues, even though this was not part of the initial research design. Adopting a flexible, qualitative design, allowed me to get unexpected insights, and to adapt my data collection strategy to the emerging interpretations. I started, then, a systematic analysis of the students’ task interpretation and its interdependence with the discursive framing of space–time which is described in the next section of this research methods case study.

With this anecdote, I aimed at emphasizing that doing qualitative research allows to explore new ideas and identify interconnections in the data that are totally unexpected before the encounter with the participants. In other words, I aimed at depicting a real situation where the “built in flexibility” mentioned by Denzin and Lincoln (2005) was successfully implemented. This was obtained by combining focused consultation of relevant literature based on my preliminary sense of the data, and the partial adjustment of my data collection and analysis based on the further insights that I got from the literature. However, as I will discuss in the next section, such flexibility of the design should not induce to a reduced rigor concerning the initial planning of the research design. There is a subtle equilibrium between these two aspects that should be respected for a good qualitative research method.

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### **Data Analysis and the Importance of the Initial Research Design**

I analyzed the data of this case study through a qualitative methodology (Goodwin, 2000) inspired by ethnography (Hammersley & Atkinson, 2007) and discourse analysis (Gee, 2014). As I have mentioned in the previous section, during the data collection I carried out an exploration of the data and made some preliminary interpretations which were useful to further direct the strategy of data collection. As I progressively developed my interpretations, I engaged in a literature review that helped me to define the criteria for selecting the relevant events for further in-depth analysis of relevant interactive events. My interest was on both the interpretation of the task and the discursive framing of space–time by the students. Thus, I identified the following criteria for the selection of relevant episodes, based on the content of

speech:

1. **Task interpretation:** Discourse where students (a) explained to each other what they should do and how they interpreted the teachers' instructions (interpreting the task) or (b) discussed the current accomplishment of the task (monitoring of the task).
2. **Space–time framing:** Discourse concerning (a) the organization of time (e.g., the definition of the schedule), (b) the organization of space (e.g., the organization of the workspaces, both in terms of physical and virtual spaces), and (c) the constraints and opportunities related to the perceived space–time.

The reader might wonder now what does it mean in practice to detect the discursive framing of space–time. Schegloff (1972) proposes a good anecdotal example of what it means to discursively frame the context in terms of space:

Were I now to formulate where my notes are, it would be correct to say that they are: right in front of me, next to the telephone, on the desk, in my office, in the office, in Room 213, in Lewisohn Hall, on campus, at school, at Columbia, in Morningside Heights, on the upper West Side, in Manhattan, in New York City, in New York State, in the North east, on the Eastern seaboard, in the United States, and so on. Each of these terms could in some sense be correct ... were its relevance provided for. (p. 81)

The same object or action can be located by the speaker within different spatial frames. Locating something as happening “in room 213” or “in Manhattan” reveals the speakers' conceptualization of the relevant context. The same is true for time: saying that an activity takes place on Thursday morning or in the post-modern historical period reveals what the speaker considers to be the relevant context. My work during this stage of data analysis has been exactly to detect discursive events in which the students were locating the task in space and time. To do this, I have used some discursive markers identified by discourse analysts, such as:

- The tense and aspect of verbs are markers of time (Fairclough, 2004)
- Specific phrases with prepositions are often used to indicate positions, transitions and settings, that is, space (van Leuven, 2008)
- Some gestures, especially deictic gestures as pointing (Goodwin, 2003), are often involved in defining space and time

However, this analysis was not carried out just by the identification of markers in the speech. Indeed, sometimes space–time relations can emerge without the specific markers or can even be taken as granted as implicit assumptions and in other cases the same marker can be used in different ways (e.g., metaphorically). This type of analysis is highly interpretive; thus, it is

always incomplete and open to revision (Fairclough, 2004; Gee, 1999).

Once these criteria were defined, I engaged in an “analytic search of the data corpus” (Heath, Hindmarsh, & Luff, 2010), that is, I went through repeated, systematic searches in the data to find the clips that met the analytic criteria. I progressively refined the selection, deleting events when their relevance became unconvincing, and added new events that I had previously ignored. During the last search for each study, I did not make any substantial modification to the selection, so I assumed (in agreement with my supervisors) that the selection could be considered definitive. As noticed by Gee (1999, p. 54) when the interpretations cease to change, it is reasonable to infer that “we have reached the limits of what contextual information was relevant to the producers and interpreters of the utterance or to our research interests.” In all this process, I met my supervisors regularly, asked them to review the selected data and discussed with them my interpretations and analytic criteria, to inter-subjectively validate them. The video clips that were finally selected have been transcribed to obtain transcriptions able to make “visible” the investigated phenomena (Bezemer & Mavers, 2011).

When I completed the process of selection and examined each selected episode, I started realizing that the temporal dimension was expressed in much richer way in the students’ discourse, if compared with the spatial one. At a first look, I assumed that this could be a finding of my research. That is, for the students in this case study, time constraints were more pressing in the situation and thus time frames were occurring more often. Another possible interpretation was that spatial frames were often invisible because they were implicit, taken as given in the students’ discourse. However, this could be related also to a methodological problem related to the research design. As I mentioned above, the teacher told me that the students could choose in advance where they would carry out the group work, and in some cases, they had to book the space in advance. It is likely that the students framed the task in space when they were taking decisions concerning the selection of the working space. This decision making took place most of the time outside of the recorded interaction, during breaks or even outside of the university, when the students booked the rooms. So, the way in which I designed the data collection might have partially compromised my ability to detect the students’ spatial framing of the task in this specific context. Thus, the conclusions that I could reach from my analysis—even though exciting—were subject to a methodological limitation, which could have been overcome if I had realized since the beginning how important it was for my research to know that the students would decide in advance where to work.

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## Conclusions

In this research methods case study, I have discussed some methodological choices and

challenges of a case study I have conducted. In particular, I focused on two aspects that are crucial for qualitative research. On the one hand, I discussed how the “built-in flexibility” of my approach allowed to reach unexpected insights that would not have been possible if I used a strict research protocol for testing only a pre-existing hypothesis. On the other hand, I have reflected on the importance of a rigorous initial planning of the design when conducting qualitative research. I have presented the main features of my method, and discussed how important it is to use preliminary information concerning the research context to optimize data collection. Missing to reflect on the methodological implications of the features of the research context bears the risk of compromising, partially or entirely, the results of the research project. I hope that the readers will find this discussion useful for planning their own qualitative research designs in the future.

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### Note

1. An overview of this case study, which was part of my doctoral research, can be found in Ritella, Ligorio, and Hakkarainen (2016). For a theoretical discussion of my approach to space and time see Ritella et al. (2017b)

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### Exercises and Discussion Questions

1. Which criteria can you define for selecting the relevant pieces of data in your own research?
2. What kind of questions shall you ask to gather all the information that you need concerning your research site?
3. What are the pros and cons of adopting a flexible research design?

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### Further Reading

**Gee, J. P.** (2014). *Unified discourse analysis: Language, reality, virtual worlds and video games*. Abingdon, UK: Routledge.

**Goldman, R., Pea, R., Barron, B., & Derry, S. J.** (2014). *Video research in the learning sciences*. Abingdon, UK: Routledge.

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